

WHAT IS CLAIMED IS:

1. A method of producing a semiconductor crystal of a Group III nitride compound semiconductor and independent of a starting substrate, said method comprising:

5 laminating a seed monolayer or multilayer on said starting substrate;

chemically or physically etching part of a seed layer-forming surface of said starting substrate to thereby partially or dispersively leave said seed layer as non-etched portions on said starting substrate; and growing said semiconductor crystal on exposed surfaces of said non-etched portions of said seed layer as initial crystal growth surfaces for starting growth of said semiconductor crystal until said crystal growth surfaces are connected to one another by crystal growth so as to be provided as at least one series of approximately flat surfaces; and

10 portions on said starting substrate; and growing said semiconductor crystal on exposed surfaces of said non-etched portions of said seed layer as initial crystal growth surfaces for starting growth of said semiconductor crystal until said crystal growth surfaces are connected to one another by crystal growth so as to be provided as at least one series of approximately flat surfaces; and

breaking said non-etched portions to thereby separate said semiconductor crystal from said starting substrate;

wherein the crystal growing step is performed by a halide vapor phase epitaxy method in the condition that supply ratio of a Group V material to a Group III material is in a range of from 30 to 80, both inclusively.

15 one another by crystal growth so as to be provided as at least one series of approximately flat surfaces; and

20 vapor phase epitaxy method in the condition that supply ratio of a Group V material to a Group III material is in a range of from 30 to 80, both inclusively.

2. A method of producing a semiconductor crystal according to claim 1, wherein a thickness of said semiconductor

25 according to claim 1, wherein a thickness of said semiconductor

crystal in the crystal growing step is not smaller than 50  $\mu\text{m}$ .

3. A method of producing a semiconductor crystal  
according to claim 1, wherein said semiconductor crystal and  
5 said starting substrate are cooled or heated to generate stress  
based on a difference between a thermal expansion coefficient  
of said semiconductor crystal and a thermal expansion  
coefficient of said starting substrate to break said non-etched  
portions by said stress.

10 4. A method of producing a semiconductor crystal  
according to claim 1, wherein said seed monolayer or an uppermost  
layer of said seed multilayer is made of gallium nitride (GaN).

15 5. A method of producing a semiconductor crystal  
according to claim 1, wherein said seed monolayer or a lowermost  
layer of said seed multilayer is made of aluminum nitride (AlN).

6. A method of producing a semiconductor crystal  
20 according to claim 1, wherein an interval for arrangement of  
said non-etched portions in the non-etched portion forming step  
is selected to be in a range of from 1  $\mu\text{m}$  to 50  $\mu\text{m}$ , both inclusively.

7. A method of producing a semiconductor crystal  
25 according to claim 1, wherein said starting substrate is etched

by 0.01  $\mu\text{m}$  or deeper in the non-etched portion forming step.

8. A method of producing a semiconductor crystal according to claim 1, wherein a lateral thickness, width or diameter of each of said non-etched portions in the non-etched portion forming step is selected to be in a range of from 0.1  $\mu\text{m}$  to 20  $\mu\text{m}$ , both inclusively.

9. A method of producing a semiconductor crystal according to claim 1, further comprising the rest removing step of removing the broken rest of said non-etched portions remaining on a rear surface of said semiconductor crystal by a chemical or physical process such as etching at least after the separating step.

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10. A Group III nitride compound semiconductor light-emitting element in which a semiconductor crystal produced by a semiconductor crystal producing method according to claim 1 is used as a crystal growth substrate.

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11. A Group III nitride compound semiconductor light-emitting element produced by crystal growth in which a semiconductor crystal A produced by a semiconductor crystal producing method according to claim 1 is used as a crystal growth substrate.

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